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A NEW SEA-URCHIN FROM THE "OLIGOCENE" OF OREGON[1]

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INTRODUCTION

Several years ago Professor Hubert G. Schenck, of Stanford University, sent to the Museum of Comparative Zoölogy a rock fragment, collected in Oregon in 1931, bearing the mold of most of the upper surface of a large spatangoid of which he desired identification. Besides the nearly complete impression, the fragment bears portions of the molds of at least three other individuals of the same species, but these are of practically no assistance in determining the systematic position of the spatangoid involved. Recently (1936) Professor Schenck has sent an additional specimen of what he thinks is the same species, but from a different locality —State of Washington, and has asked for a name by which these echini may be designated.

There is no doubt that the molds in the earlier specimen represent more or less of the petaloid areas of a species of *Brisaster,* very similar to, but probably not identical with, the Recent species, *B. townsendi* (A. Ag.), which occurs along the whole western coast of North America in water of moderate (511-995 fathoms) depth. The apical system of the fossil is much more anterior than in *townsendi,* and the petals are straighter and relatively narrower. But unfortunately *townsendi* is a very variable species and not a great deal of reliance can be placed on these differences.

[1] Abstract in Geol. Soc. Am. Proc. for 1936 (1937).

In view, however, of the very much greater size of the fossil form, it may perhaps be justifiable to lay some stress on the markedly anterior apical system and distinguish the extinct species from its Recent congener under the name *maximus*. Careful comparison with a large example of *townsendi* enables one to describe this new *Brisaster* as follows:

Brisaster maximus, sp. nov.

Plate 24, fig. 9

Length about 84 mm., with the width approximately 76 mm.; nearly the whole width is shown in the large mold. If the proportions were the same as in *townsendi,* the height was about 42 mm. In the Recent species the apex is far back of the middle of the dorsal surface, so that its center is only .40 of the test length from the posterior margin of the test; in the fossil the apex is so near the center that the anterior margin could not have been more than 4 or 5 mm. further away than the rear end of the test. As a result of this difference in the position of the apex, the distal ends of petals I and V are far from the test margin in *maximus*, while in *townsendi* they nearly reach it; indeed, in some specimens they would overreach it if they did not diverge markedly from each other and from the longitudinal axis. The size of the petals and the angles which they make with the axis and with each other show very great diversity in *townsendi,* but it is rare for petals I and V to form as narrow an angle with each other as they do in *maximus* (about 80°); in *townsendi* the angle commonly exceeds 90° and may be much more.

The tuberculation of the test in *maximus* was apparently very much as in *townsendi,* the larger tubercles occurring beside the petals, especially near the distal ends. Fragments of the peripetalous fasciole can be distinguished here and there, most evidently around the tip of petal V and thence anteriorly towards petal IV.

Holotype and Type Locality

The holotype of *maximus* is in the Museum of Comparative Zoölogy, Harvard University, No. 3830; a plastotype is in the Schenck Collection, Stanford University, No. 2196. Collector: John T. Holman, who describes the type locality (Holman field locality No. 44) as follows:

Washington County, Oregon, from the center of the south line of Section 12, T. 3 N., R. 4 W.; dug well along road at C. H. Bonham farm; 1000 feet south of coal seam exposure; Pittsburg Bluff formation, Refugian Stage; *Acila shumardi* zone, "Oligocene" of Pacific Slope authors.

The locality is shown on the map in the monograph by Schenck (1936, p. 43).

SPECIMEN FROM WASHINGTON

The specimen sent by Professor Schenck in 1936 comes from "Loc. N. P. 55,[2] near Porter, Washington," H. Hannibal, collector. It consists of the upper and lower portions of a mold in a soft, clay-like, gray rock. In connection with petal IV, on the lower portion, is a small part of the test with many minute spines still present, while on the upper portion a large part of the peripetalous fasciole can be made out. The specimen was badly crushed before fossilization and its normal size and proportions are therefore uncertain. Apparently it was 60-65 mm. long and 50-55 mm. wide. While it seems unquestionably a *Brisaster,* there are some features of the petals I and V that are unlike *maximus* and make it possible to have some doubts as to its identity with the Oregon specimens, in spite of Professor Schenck's opinion (presumably on stratigraphical grounds) that "it must belong to the same species." But in view of the great diversity shown by individuals of *townsendi,* it seems foolish to doubt that the Oregon and Washington fossils represent the same species of *Brisaster,* since their geological position is essentially the same. Whether *maximus* is the direct forerunner of *townsendi* is a matter that admits of more uncertainty.

THE GENUS BRISASTER

The genus *Brisaster* was named by Gray (Cat. Rec. Ech. Brit. Mus., p. 61, 1855) as a subgenus of *Schizaster* with three species; *fragilis, gibberulus,* and *cubensis.* The year before, d'Orbigny (Pal. France Crét., p. 270, 1854) had placed *cubensis* in the genus *Periaster.* In 1883, Pomel (Class. Méth. Ech., p. 36) made *gibberulus* the type of the genus *Paraster.* Thus, *Schizaster fragilis* Agassiz and Desor, 1847, alone is left to be the type of *Brisaster.*

A. Agassiz, Duncan, and W. B. Clark and Twitchell never recognized *Brisaster,* but treated it as a synonym of *Schizaster.* However, Mortensen (Ingolf Ech. pt. 2, pp. 122-123, 1907) discussed the genus *Schizaster,* recognizing four subgenera: *Paraster, Schizaster,* s.s., *Tripylaster,* and *Brisaster.* H. L. Clark (Mem. Mus. Comp. Zoöl., vol. 46, no. 2, pp. 159 et seq., 1917) accepted Mortensen's four biologic units as valid

[2] Professor Schenck informs me that the initials stand for "North Pacific" and that the number is H. Hannibal field locality No. 55.

genera, and included six Recent species in *Brisaster*, two of which (*latifrons* and *townsendi*), occur in the eastern and northern Pacific Ocean. In short, there can be no doubt that *Brisaster* is a valid nomenclatural unit.

The species of *Schizaster* and *Brisaster* are distinguished by three characters, as follows:

1. Test relatively high and more or less swollen in *Schizaster*, especially posteriorly; more flattened and widened in *Brisaster*.

2. Genital pores: two in *Schizaster*, three in *Brisaster*.

3. In *Schizaster*, petals II and IV are short, wide, divergent; petal III deeply sunken, but usually not very broad. In *Brisaster*, petals II and IV are long, comparatively narrow, directed well forward, sometimes so markedly so as to be nearly parallel for a short distance; petal III somewhat sunken, broad.

The time range of *Brisaster* is given commonly as Eocene to Recent, as may well be. Lambert and Thiéry, for example, list a number of species of *Brisaster* which they assign to the Eocene. There is not one that can unqualifiedly be called *Brisaster*, although *Schizaster pyrenaicus* Munier-Chalmas is a likely candidate.

SELECTED BIBLIOGRAPHY

AGASSIZ, ALEXANDER

1904. The Panamic Deep Sea Echini. Mem. Mus. Comp. Zoöl., vol. 31, pp. 1-243, 112 pls., chart, 319 text figs.

AGASSIZ, LOUIS (and DESOR, EDOUARD)

1847. Catalogue raisonné des familles, des genres et des espèces de la classe des Echinodermes. Ann. Sci. Nat. sér. III, Tom. VI-VIII, Paris.

CLARK, HUBERT LYMAN

1917. Hawaiian and other Pacific Echini, based upon collections made by the U. S. Fish Commission Steamer Albatross in 1902, Commander Chauncey Thomas, U. S. N., Commanding. The Spatangina. Mem. Mus. Comp. Zoöl., vol. 46, no. 2, p. 85-283, 22 pls.

GRAY, JOHN E.

1855. Catalogue of the Recent Echinida in the British Museum, pt. 1, Echinida Irregularia, London.

KEW, WILLIAM S. W.

1920. Cretaceous and Cenozoic Echinoidea of the Pacific Coast of North America. Univ. Calif. Pub. Dept. Geol., Bull. vol. 12, no. 2, pp. 23-236, 40 pls., 5 figs.

MERRIAM, JOHN C.

1899. The Tertiary Sea Urchins of Middle California. California Academy of Sciences, Proc. (3rd Series), Geol., vol. 1, no. 5, pp. 161-174, 2 pls.

MORTENSEN, TH.

1907. Echinoidea. The Danish Ingolf-Expedition, 1895-1896. Scientific Reports, vol. 4, pt. 2, pp. 1-200, 19 pls.

D'ORBIGNY, ALCIDE

1853-1860. Paléontologie francaise, Description zoologique et géologique de tous les animaux mollusques et rayonnés fossiles de France, Terrains crétacés, VI Echinodermes, Atlas de pl., Paris.

POMEL, M. A. (AUGUSTE)

1883. Classification Méthodique et Genera des Echinides Vivants et Fossiles, Thesis for Dr.'s Degree, Paris, pp. 132, 1 pl., Alger.

SCHENCK, HUBERT G.

1936. Nuculid Bivalves of the Genus Acila. Geol. Soc. Am., Special Paper 4, pp. 149, 18 pls., 15 figs. in text.

Explanation of Plate

Figs. 1-6. *Brisaster fragilis* (Agassiz and Desor), x 3/4.

Recent. Hypotype No. 6064, (Stanford University Paleo. Type Coll.). Off east coast of the United States, 140-216 fathoms. Length of specimen 49.2 mm., width 46.8, thickness 30.8.

Figs. 7-8. *Brisaster latifrons* (Agassiz), x 4/5.

Recent. Eastern Pacific, "Albatross" station 3431, 995 fathoms. (Copy of protographs).

Fig. 9. *Brisaster maximus* H. L. Clark, n. sp., x 2/3.

Holotype No. 3830, (Museum of Comparative Zoölogy, Harvard University). From Washington County, Oregon, Sec. 12, T. 3 N., R. 4 W. "Oligocene."

Figs. 10-12. *Brisaster townsendi* (Agassiz). Recent. Eastern Pacific.

Figs. 10-11, x 4/5. Hypotype No. 6949, (Calif. Acad. Sci. Loc. 28046). Howe Sound, British Columbia. Collector, S. A. Glassell. Length, 50.4 mm., thickness 26.8 mm.

Fig. 12, x 4/5. Hypotype No. 6950, (Calif. Acad. Sci. Loc. 28046). Howe Sound, British Columbia. Length, 56.5 mm. (Photographs of this species by Frank L. Rogers, W. P. A. project).

Figs. 3, 8, and 12 are views of the upper surface.

Figs. 2, 7, and 10 are views of the lower surface.

Figs. 1 and 11 are views of the rear end.

Figs. 5 and 6 are side views.

Fig. 4 is an anterior end view.